

Sand Pine Survival and Growth On Prepared and Unprepared Sites

Kenneth W. Outcalt and Raymond H. Brendemuehl

ABSTRACT. Sand pine seedlings were planted on sites prepared by double chopping and on unprepared sites in scrub oak stands in the northwest Florida sandhills. Although survival was lower on unprepared areas, plantations of both Ocala (*Pinus clausa* var. *clausa* Ward) and Choctawhatchee sand pine (*P. clausa* var. *immuginata* Ward) still had acceptable stocking on unprepared sites at age 10. Thus, both varieties can be successfully established by underplanting among scrub hardwoods. Chopping, however, increased height, diameter, and volume growth. Total stem volume per acre was three to four times greater on chopped sites, and this difference continues to increase. Therefore, chopping prior to planting sand pine on these areas should be economically advantageous.

Extensive testing has shown that double chopping is the most effective means of reducing scrub hardwood competition and encouraging planted pine survival and growth on sandhills sites in northwest Florida (Burns and Hebb 1972). Chopping conserves the limited nutrient capital by leaving the topsoil in place and incorporating herbaceous and woody vegetation into the soil. For these reasons chopping has been used extensively for conversion of scrub hardwoods to sand pine [*Pinus clausa* (Chapm.) Vasey].

Site preparation is not required, however. Ocala

Table 1. Average survival of Ocala and Choctawhatchee sand pine on unprepared and chopped sites through 10 years of age.

Age	Survival			
	Ocala		Choctawhatchee	
	unprepared	chopped	unprepared	chopped
Years	Percent			
1	83.2	91.2	91.4	96.7
2	77.2	90.8	87.5	95.9
3	75.6	90.1	86.2	95.6
5	74.5	89.8	84.2	95.4
9	73.5	89.6	83.8	95.4
10	73.5	87.5	83.8	95.4

sand pine can be established by underplanting among the scrub hardwoods on sandhills sites (Hebb and Burns 1973). Eventually the pines will overtop and suppress competitors. The frequent invasion of scrub hardwood stands by Choctawhatchee sand pine indicates that it can also withstand hardwood competition. In view of rising costs, is intensive site preparation for conversion to sand pine worthwhile? Reported here are the 10-year results of a study designed to help answer this question.

METHODS

The plantations are located in northwest Florida on the Eglin Air Force Base in Okaloosa County. The topography is gently rolling and the soils are Lakeland sands. Prior to treatment the sites were dominated by typical sandhills vegetation—scrub hardwoods—mainly turkey oak (*Quercus laevis* Walt.) and bluejack oak (*Q. incana* Bartr.), scattered longleaf pine (*P. palustris* Mill.), and wiregrass (*Aristida stricta* Michx.).

One-half of each of four areas about four acres each was double chopped during the summer of

Table 2. Average diameter and volume of Ocala and Choctawhatchee sand pine at plantation ages 9 and 10 years.

Age	Unprepared		Double chopped	
	Diameter	Volume ¹	Diameter	Volume
Years	Inches	Ft ³ /acre	Inches	Ft ³ /acre
<i>Ocala</i>				
9	1.96	150	3.31	530
10	2.17	200	3.57	695
<i>Choctawhatchee</i>				
9	1.53	115	3.16	515
10	1.86	165	3.53	710

¹ Volumes are for the total stem based on an equation from Rockwood and others (1980).

1968. Seedlings (1-0) were lifted and machine planted in January and February 1969 at a 6 by 10 ft. spacing. The two varieties of sand pine were planted in adjacent prepared and unprepared plots about two acres in size at each of the four sites. Data were collected from central measurement plots containing 12 rows of 10 trees each.

RESULTS

Site preparation improved survival of both varieties but Ocala benefited more (Table 1). There has been very little mortality in any of the treatments since age 5 except for Ocala on chopped areas. This was probably due to mushroom root rot (*Armillariella tabescens* Scop. ex Fr.), as indicated by the number of windthrown trees found in those stands.

Trees grew faster on chopped than on unprepared areas (Figures 1 and 2). By 10 years of age,

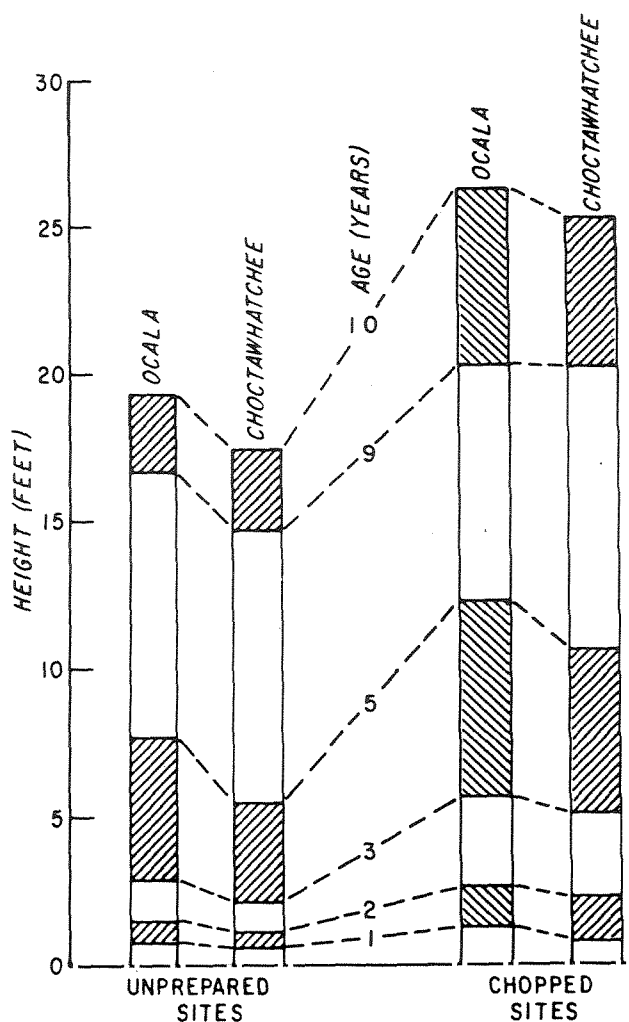


Figure 1. Height growth of sand pine on unprepared and chopped sites.



Figure 2 (left). Choctawhatchee sand pine at plantation age 10 on unprepared site (top) and on a double chopped site (bottom).

height was 7.2 and 7.8 ft. greater for the Ocala and Choctawhatchee varieties, respectively. Even though the difference in annual growth rate has diminished, trees on chopped sites are still growing about 0.5 ft. more per year than those on unprepared areas. Typically the Ocala variety had better juvenile height growth than Choctawhatchee, but by age 10 no significant difference in total height existed on either treatment.

Diameter growth was increased more by site preparation than was height growth. At age 10 average Ocala diameter on chopped sites was 40 percent greater than on unprepared sites (Table 2). Average Choctawhatchee diameter was about 50 percent greater on chopped areas. Although Ocala trees had a larger average diameter, Choctawhatchee diameter growth was greater between ages 9 and 10 years.

The main objective of site preparation is to obtain a well-stocked stand of vigorously growing trees which will ultimately result in increased wood production. On this basis, chopping was very beneficial; wood volume increased 3.4 times for Ocala and 4.4 times for Choctawhatchee (Table 2). Both varieties were about equally productive on chopped sites at age 10.

DISCUSSION

Stands on unprepared areas are well stocked, with 500 or more trees per acre, and the present mortality rate is very low. Thus, both varieties of sand pine can be successfully established by underplanting among the scrub hardwoods which exist on many sandhills sites. Because Chocta-

whatchee has better survival and seems to suffer less from mushroom root rot, it is preferred over Ocala for underplanting. This would be a viable alternative for the small landowner who cannot obtain, or cannot afford, intensive site preparation. The landowner would have the option of increasing growth rates by releasing the pines at a later date (Hebb and Burns 1973).

Reduction of competition by double chopping significantly increased the growth of planted sand pines. Even though the difference in growth rate is diminishing, trees on chopped areas will likely continue to be more productive until those on unprepared sites can overtop and suppress the competing hardwoods. Past work indicates this will take another 5 to 10 years (Hebb and Burns 1973). Thus, the difference in volume, which is already three to four times greater on chopped sites, should increase. With such a large difference in production, chopping prior to planting sand pine would pay off.

Literature Cited

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Kenneth W. Outcalt is soil scientist, Southeastern Forest Experiment Station, USDA Forest Service, Gainesville, Florida 32611; and Raymond H. Brendemuehl is research forester (retired), Southeastern Forest Experiment Station, USDA Forest Service, Marianna, Florida 32446.

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